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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/776,223
Filing Date: February 12, 2004
Appellant(s): MA ET AL.

Brian K. Seidleck
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 21, 2009 appealing from the Office action mailed June 24, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

7,147,943	ONO et al.	12-2006
7,067,206	UWAZUMI et al	6-2006

6,432,563	ZOU et al	8-2002
4,888,211	OKA et al	12-1989

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 6-8, 11-14, 26, 28, 29, 31, 32, 35, 37-40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uwazumi et al. (U.S. Pat. 7,067,206) in view of Oka et al. (U.S. Pat. 4,888,211).

Regarding claim 1, Uwazumi et al. teach a method of manufacturing granular magnetic recording media. (See Abstract) Uwazumi et al. teach providing a non-magnetic substrate including a surface. (Column 3 lines 16-18) Uwazumi et al. teach forming a layer stack on the surface of the substrate. The layer stack includes an outermost granular magnetic recording layer. (Column 3 lines 16-21; Column 3 lines 32-41) A protective overcoat layer is formed on the magnetic layer. (Column 3 lines 19-20)

Regarding claim 2, Uwazumi et al. teach forming a layer stack including an outermost granular perpendicular magnetic recording layer. (Column 3 lines 16-21)

Regarding claim 8, Uwazumi et al. teach forming a carbon protective overcoat. (Column 3 lines 53-54)

Regarding claim 11, Uwazumi et al. teach that the substrate can be NiP- plated aluminum or glass. (Column 3 lines 25-27)

Regarding claim 12, Uwazumi et al. teach that the granular magnetic layer can be CoPtCr or CoPt and an oxide of Si, Al, Ti, Ta. (Column 3 lines 42-49)

Regarding claim 13, Uwazumi et al. teach providing a lubricant topcoat layer on the protective overcoat layer. (Column 3 lines 54-55)

Regarding claim 14, Uwazumi et al. teach providing a lubricant of perfluoropolyether material. (Column 3 lines 54-55)

Regarding claim 26, Uwazumi et al. teach a method of manufacturing granular magnetic recording media. (See Abstract) Uwazumi et al. teach providing a non-magnetic substrate including a surface. (Column 3 lines 16-18) Uwazumi et al. teach forming a layer stack on the surface of the substrate. The layer stack includes an outermost granular magnetic recording layer. (Column 3 lines 16-21; Column 3 lines 32-41) A protective overcoat layer is formed on the magnetic layer. (Column 3 lines 19-20)

Regarding claim 29, Uwazumi et al. teach forming a layer stack including an outermost granular perpendicular magnetic recording layer. (Column 3 lines 16-21)

Regarding claim 31, Uwazumi et al. teach that the granular magnetic layer can be CoPtCr or CoPt and an oxide of Si, Al, Ti, Ta. (Column 3 lines 42-49)

Regarding claim 32, Uwazumi et al. teach a method of manufacturing granular magnetic recording media. (See Abstract) Uwazumi et al. teach providing a non-magnetic substrate including a surface. (Column 3 lines 16-18) Uwazumi et al. teach forming a layer stack on the surface of the substrate. The layer stack includes an outermost granular magnetic recording layer. (Column 3 lines 16-21; Column 3 lines 32-41) A protective overcoat layer is formed on the magnetic layer. (Column 3 lines 19-20)

Regarding claim 35, Uwazumi et al. teach forming a layer stack including an outermost granular perpendicular magnetic recording layer. (Column 3 lines 16-21)

The differences between Uwazumi et al. and the present claims is that the magnetic layer having a nano-scale rough and porous surface is not discussed (Claims 1, 26, 32), treating the exposed surface of the granular magnetic recording layer to provide at least one of a reduction in nano-scale roughness and porosity, increased compositional homogeneity, increased microstructural homogeneity, preferential removal of at least one element, and increased grain boundary coverage by a subsequently deposited protective overcoat layer is not discussed (Claim 1), etching the surface of the granular magnetic recording layer is not discussed (Claims 1, 26), the etching comprising sputter etching is not discussed (Claims 1, 26, 32), utilizing inert gas ions for sputter etching is not discussed (Claims 6, 28, 32), utilizing Ar ions for sputter etching is not discussed (Claim 7), the nano-scale roughness being less than 2.0 angstroms is not discussed (Claims 32, 37, 39) and the nano-scale roughness being less than 1.5 Angstroms is not discussed (Claims 38, 40, 42).

Regarding claims the magnetic layer having a nano-scale rough and porous surface of claims 1, 26, 32, since Uwazumi et al. suggest the same method (i.e. sputter deposition with at least one reactive gas of oxygen) the nano-scale rough and porous surface is believed to be produced. (See Uwazumi et al. discussed above) Furthermore, as shown by Oka et al. a reactive deposition process produces a granular magnetic recording media. (Column 2 lines 32-36; Column 3 lines 53-59; Column 3 lines 66-68; Column 4 lines 1-2) Oka et al. teach providing a non-magnetic substrate

including a surface. (Column 6 lines 17-22) Oka et al. teach forming a layer stack on the surface of the substrate, the layer including an outmost granular magnetic recording layer with an exposed nano-scale and porous surface. (Column 3 lines 53-59; Column 5 lines 34-39; Fig. 1)

Regarding treating the exposed surface of the granular magnetic recording layer to provide at least one of a reduction in nano-scale roughness and porosity, increased compositional homogeneity, increased microstructural homogeneity, preferential removal of at least one element, and increased grain boundary coverage by a subsequently deposited protective overcoat layer (Claim 1), Oka et al. teach treating the exposed nano-rough and porous surface of the granular recording layer to provide at least an increased microstructural homogeneity. The treating can include sputter etching the surface of the magnetic layer with inert gas ions of argon. (Column 11 lines 16-19; Column 11 lines 42-49) A protecting layer can be formed on the treated surface of the granular magnetic recording layer. (Column 12 lines 32-33)

Regarding etching the surface of the granular magnetic recording layer (Claims 1, 26), Oka et al. teach treating can include sputter etching the surface of the magnetic layer with inert gas ions of argon. (Column 11 lines 16-19; Column 11 lines 42-49)

Regarding etching comprising sputter etching (Claims 1, 26, 32), Oka et al. teach treating can include sputter etching the surface of the magnetic layer with inert gas ions of argon. (Column 11 lines 16-19; Column 11 lines 42-49)

Regarding utilizing inert gas ions for sputter etching (Claims 6, 28, 32), Oka et al. teach treating can include sputter etching the surface of the magnetic layer with inert gas ions of argon. (Column 11 lines 16-19; Column 11 lines 42-49)

Regarding utilizing Ar ions for sputter etching (Claim 7), Oka et al. teach treating can include sputter etching the surface of the magnetic layer with inert gas ions of argon. (Column 11 lines 16-19; Column 11 lines 42-49)

Regarding the nano-scale roughness being less than 2.0 angstroms (Claims 32, 37, 39), since the process for producing the magnetic layer is the same as Applicant's process the nanoscale roughness is achieved. (See Uwazumi et al. discussed above)

Regarding the nano-scale roughness being less than 1.5 Angstroms (Claims 38, 40, 42), since the process for producing the magnetic layer is the same as Applicant's process the nanoscale roughness is achieved. (See Uwazumi et al. discussed above)

The motivation for utilizing the features of Oka et al. is that it allows for producing a magnetic recording layer being free from cracks on the surface. (Column 2 lines 35-36)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Uwazumi et al. by utilizing the features of Oka et al. because it allows for producing a magnetic recording layer being free from cracks on the surface.

Claims 3, 30, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uwazumi et al. in view of Oka et al. as applied to claims 1, 2, 6-8, 11-14, 26, 28, 29, 31, 32, 35, 37-40 and 42 above, and further in view of Zou et al. (U.S. Pat. 6,432,563).

Regarding claim 3, 30, 36, Zou et al. teach a granular magnetic layer that is longitudinal for use in magnetic medium. (Column 4 lines 61-68; Column 5 lines 35-47)

The motivation for utilizing the features of Zou et al. is that it allows for producing magnetic layers with increased coercivity and lower noise. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized longitudinal magnetic recording medium as taught by Zou et al. because it allows for producing magnetic layers with increased coercivity and lower noise.

Claims 9, 10, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uwazumi et al. in view of Oka et al. as applied to claims 1, 2, 6-8, 11-14, 26, 28, 29, 31, 32, 35, 37-40 and 42 above, and further in view of Ono et al. (U.S. Pat. 7,147,943).

The difference not yet discussed is forming a diamond-like carbon protective layer is not discussed (Claims 9, 33) and forming a DLC protective overcoat layer by ion beam deposition is not discussed (Claims 10, 34).

Regarding claims 9, 10, 33, 34, Ono et al. teach forming a DLC protecting layer for a magnetic layer by ion beam deposition (IBD). (Column 8 lines 39-43)

The motivation for utilizing the feature Ono et al. is that it allows for providing a protecting layer that has high bonding force to the lubricating layer. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Ono et al. because it allows for providing a protecting layer that has high bonding force to the lubricating layer.

(10) Response to Argument

Response to the arguments based on the rejection of claims 1, 2, 6-8, 11-14, 26, 28, 29, 31, 32, 35, 37-40, and 42 under 35 U.S.C. 103 based on Uwazumi and Oka:

Independent Claim 1

In response to the argument that Oka teach away from the claimed sputter deposition of an outermost granular layer, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. While Oka teaches heating when depositing Appellant's claims do not preclude heating during deposition. While Appellant point out that evaporation is preferred for industrial mass production it is argued that Oka do not preclude sputtering on smaller scale operations. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have been motivated to sputter etch the outermost granular magnetic recording layer after forming this layer by sputter deposition because Oka teaches away from using sputter deposition to form the outermost granular layer, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka state that sputter deposition is not a suitable method for industrial production, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka requires heating to improve the magnetic characteristics of the film, it is argued that while Oka teaches heating when depositing Appellant's claims do not preclude heating during deposition. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka teaches using electron beam vacuum deposition over sputter deposition, it is argued that the primary reference to Uwazumi et al. teach sputtering and that Oka teach sputtering on smaller scales. Therefore one of ordinary skill in the art would utilize sputtering to form the layers. (See Oka and Uwazumi discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does

not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Independent Claim 26

In response to the argument that Oka teach away from the claimed sputter deposition of an outermost granular layer, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. While Oka teaches heating when depositing Appellant's claims do not preclude heating during deposition. While Appellant point out that evaporation is preferred for industrial mass production it is argued that Oka do not preclude sputtering on smaller scale operations. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have been motivated to sputter etch the outermost granular magnetic recording layer after forming this layer by sputter deposition because Oka teaches away from using sputter deposition to form the outermost granular layer, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka state that sputter deposition is not a suitable method for industrial production, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka requires heating to improve the magnetic characteristics of the film, it is argued that while Oka teaches heating when depositing Appellant's claims do not preclude heating during deposition. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka teaches using electron beam vacuum deposition over sputter deposition, it is argued that the primary reference to Uwazumi et al. teach sputtering and that Oka teach sputtering on smaller scales. Therefore one of ordinary skill in the art would utilize sputtering to form the layers. (See Oka and Uwazumi discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does

not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Independent Claim 32

In response to the argument that Oka teach away from the claimed sputter deposition of an outermost granular layer, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. While Oka teaches heating when depositing Appellant's claims do not preclude heating during deposition. While Appellant point out that evaporation is preferred for industrial mass production it is argued that Oka do not preclude sputtering on smaller scale operations. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have been motivated to sputter etch the outermost granular magnetic recording layer after forming this layer by sputter deposition because Oka teaches away from using sputter deposition to form the outermost granular layer, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka state that sputter deposition is not a suitable method for industrial production, it is argued that Oka while suggesting that sputtering is not sufficient for industrial production Oka do not preclude sputtering for smaller scale operations. As such Oka would not teach away from sputtering on smaller scales since the claims are not limited on what scale the production occurs. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka requires heating to improve the magnetic characteristics of the film, it is argued that while Oka teaches heating when depositing Appellant's claims do not preclude heating during deposition. (See Oka discussed above)

In response to the argument that one of ordinary skill in the art would not have looked to Oka because Oka teaches using electron beam vacuum deposition over sputter deposition, it is argued that the primary reference to Uwazumi et al. teach sputtering and that Oka teach sputtering on smaller scales. Therefore one of ordinary skill in the art would utilize sputtering to form the layers. (See Oka and Uwazumi discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does

not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to the argument that the Examiner's using official notice to teach the magnetic recording layer to be less than 2.0 Angstroms, it is argued that since the process for producing the magnetic layer is the same as Appellant's process the nanoscale roughness is achieved. (See Oka Column 2 lines 32-36; Column 3 lines 53-59; Column 3 lines 66-68; Column 4 lines 1-2)

In response to the argument that decrease in nano-scale roughness of the outermost granular magnetic recording layer is an effect of sputter etching and is an unexpected result not recognized by the prior art, Oka et al. teach treating the exposed nano-rough and porous surface of the granular recording layer to provide at least an increased microstructural homogeneity. The treating can include sputter etching the surface of the magnetic layer with inert gas ions of argon. The treating decreases the nano-scale roughness inherently by the action of sputter etching since the friction coefficient is reduced. (Oka Column 11 lines 16-19; Column 11 lines 42-49; Column 10 lines 58-65)

Response to the arguments based on the rejection of dependent claims 3, 30, and 36 under 35 U.S.C. 103 based on Uwazumi in view of Oka, and further in view of Zou:

In response to the argument that Zou does not cure the deficiencies of Uwazumi and Oka, it is argued that as discussed above Uwazumi and Oka teach the claimed

subject matter. Zou was relied upon to teach forming a granular magnetic layer. (See Zou, Uwazumi and Oka discussed above)

Response to the arguments based on the rejection of dependent claims 9, 10, 33 and 34 under 35 U.S.C. 103 based on Uwazumi in view of Oka and further in view of Ono:

In response to the argument that Ono does not cure the deficiencies of Uwazumi and Oka, it is argued that as discussed above Uwazumi and Oka teach the claimed subject matter. Ono was relied upon to teach forming a DLC protecting layer for a magnetic layer by ion beam deposition (IBD). (See Ono, Uwazumi and Oka discussed above)

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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/Rodney G. McDonald/

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